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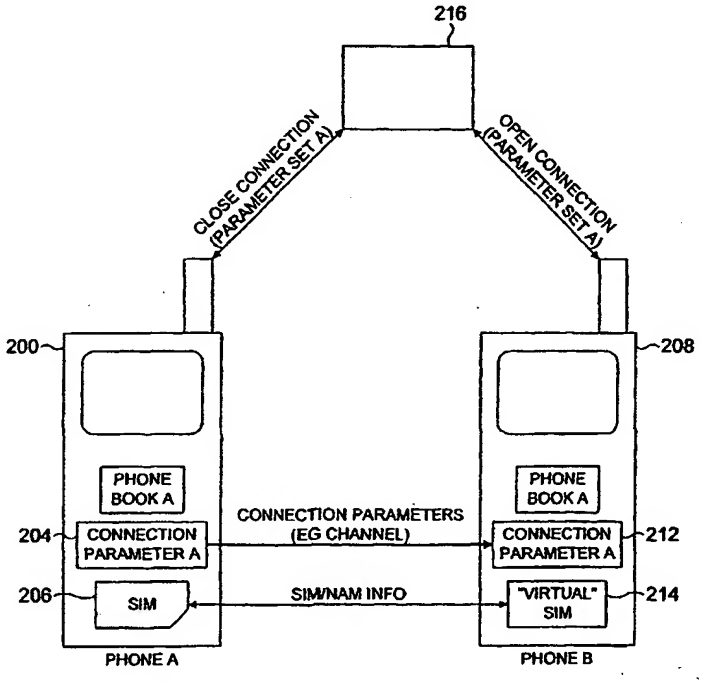
(54) Title: RADIOTELEPHONE SYSTEM



INVENTION; FIRST EMBODIMENT

(57) Abstract: In a typical radiotelephone system, such as GSM, each radiotelephone or cellular device requires a subscriber identification module (SIM) in order to communicate with a telecommunications network. Generally the SIMs are removable from a radiotelephone and may placed in another radiotelephone, which thereby connects to the network using information contained in the SIM. This, however, can prove extremely inconvenient for the user having two or more radiotelephones. One way around this problem is for the user to have just one SIM, and to physically transfer the SIM to whichever radiotelephone is currently in use. This, however, is cumbersome since first the power must be switched off, the SIM must be removed, the SIM inserted into the new device, the new device must be powered on, and finally the new device must go through the initialisation and network authorisation phases. During this time no calls can be made or received. This process is further hindered by the fact that in many radiotelephones the SIM is located behind the battery, so that the additional steps of removing and replacing the battery must be performed. Accordingly, one aim of the present invention is to overcome the above-mentioned problems.

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RADIOTELEPHONE SYSTEM

The present invention relates to mobile communications, and particularly to portable radio telephones.

In a typical radiotelephone system, such as GSM, each radiotelephone or cellular device requires a subscriber identification module (SIM) in order to communicate with a telecommunications network. The SIM contains details such as the subscriber number (telephone number), phonebook information, and security information for validating and providing secure access to the telecommunications network. Generally the SIMs are removable from a radiotelephone and may placed in another radiotelephone, which thereby connects to the network using information contained in the SIM. For security reasons each SIM is unique and duplicate SIM's cannot be used in, for example, separate cellular devices. This, however, can prove extremely inconvenient for the user having two or more radiotelephones.

Other radiotelephone standards do not use subscriber identification modules but have a number assignment module (NAM) or other similar device for storing identification information. A NAM typically provides information similar to that provided by a SIM, but in a non-removable format, such as in a protected area of memory with a radiotelephone. Additionally, a NAM may also include information relating to the radiotelephone itself, such as a unique radiotelephone identifier.

Consider the case where a user has, for example a hand portable radiotelephone for normal use, and a car radiotelephone for use whilst driving. The user would need one SIM for each radiotelephone, although only one radiotelephone would be operated at any one time. This also creates additional problems, for example, as the user has two different subscriber

numbers. This means that anyone trying to contact the user would need to try perhaps both subscriber numbers depending on whether the user is using the hand portable or car radiotelephone.

One way around this problem is for the user to have just one SIM, and to physically transfer the SIM to whichever radiotelephone is currently in use. This, however, is cumbersome since first the power must be switched off, the SIM must be removed, the SIM inserted into the new device, the new device must be powered on, and finally the new device must go through the initialisation and network authorisation phases. During this time no calls can be made or received. This process is further hindered by the fact that in many radiotelephones the SIM is located behind the battery, so that the additional steps of removing and replacing the battery must be performed.

Various methods are known whereby SIM information in one radiotelephone may be read or accessed by another radiotelephone, for example, as described in European Patent 0 378 450. Such systems allow a single SIM to be shared (although not simultaneously) among multiple radiotelephones. However, such systems still require a lengthy transfer procedure, i.e. the time taken for a radiotelephone to be fully operational after having accessed the SIM information from another radiotelephone.

Accordingly, one aim of the present invention is to overcome the above-mentioned problems.

According to a first aspect of the present invention there is provided a communication system comprising first and second communication devices capable of communicating with a telecommunications network, the first communication device comprising identification information, the second communication device being capable of remotely acquiring at least some of the identification information of the first communication device, wherein the

second communication device is further capable of acquiring connection parameters from the first communication device and applying the acquired parameters to effect a connection to the network.

According to a second aspect of the present invention there is provided a method of connecting a first communication device to a network using information contained in a second communication device already connected to the network, comprising: acquiring, at the first communication device at least some of the information contained in the second communication device; further acquiring, at the first communication device, connection parameters stored in the second communication device; using the acquired parameters to connect the first communication device to the network.

One advantage of the present invention is that the management of multiple radiotelephones is facilitated. Furthermore, the present invention advantageously provides a mechanism which allows the exchange of the responsibility from one cellular system to another. Further advantages provided by the present invention include improvements in the amount of time needed to perform such responsibility exchange. The present invention also allows the hand-over from one radiotelephone to another during use.

The invention will now be described, by way of example only, with reference to the accompanying drawings, in which:

Figure 1 is a block diagram of a system according to the prior art;

Figure 2 is a block diagram of a system according to a first embodiment of the present invention;

Figure 2a is an event diagram showing the main events which occur during identity transfer;

Figure 3 is a block diagram of a system according to a further embodiment of the present invention.

Figure 1 is a block diagram of a system according to the prior art. A pair of radiotelephones 100 and 108 are shown. Both radiotelephones 100 and 108 are capable of communication with a telecommunications network 116. radiotelephone 100 comprises a phonebook 102, and a subscriber identification module (SIM) 106. The radiotelephone 108 also comprises a phonebook 110, and a virtual SIM 114. Although radiotelephone 108 does not have its own SIM, it is capable of accessing information in the SIM 106 of radiotelephone 100. In this way, radiotelephone 108 can acquire information contained in the SIM of radiotelephone 100. Alternatively, the radiotelephone 108 may posses its own SIM, in addition to the virtual SIM 114. A system for transferring SIM information between radiotelephones is described in our European Patent 0 378 450.

Once the radiotelephone 108 has acquired information contained in the SIM of radiotelephone 100, the radiotelephone 100 is made passive so that the radiotelephone 108 can connect to the telecommunications network 116 and become active. The GSM standard does not permit devices having the same SIM to be active on the network, therefore if the SIM of a first device is used by a second device, the first device must be made passive before the second device is made active.

When the second device is made active it must go through the network identification and connection routines, searching for the strongest channel, authentication etc. One major problem with this is the time taken by making the first device passive then making the second device active.

Figure 2 is a block diagram of a system according to a first embodiment of the present invention. Figure 2 is essentially the same as Figure 1 with the addition of memory 204 in radiotelephone 200 for storing connection parameters, and a memory 212 in radiotelephone 208. The connection parameters stored in memory 204 contain information relating to the current

connection to the telecommunications network 216. The connection parameters can include information such as the radio channel in use, frequency bands, GSM channel having the strongest signal strength etc. Those skilled in the art will appreciate that in other communication systems, such as GPRS, CDMA etc, additional parameters could also be included.

When radiotelephone 208 acquires information contained in the SIM of the radiotelephone 200, the radiotelephone 208 additionally acquires the connection parameters stored in the memory 204 of radiotelephone 200. These acquired connection parameters may be stored in the memory 212 of radiotelephone 208.

When the radiotelephone 200 is made passive, as described above, and radiotelephone 208 is made active, the radiotelephone 208 uses the acquired connection parameters to establish a connection with the telecommunications network 216. Since the radiotelephone 208 uses the same connection parameters as used by the radiotelephone 200, connection time to the telecommunications network is greatly reduced, since this removes the need for the radiotelephone 208 to go through the usual channel searching procedures etc.

Figure 2a is an event diagram showing the main events which occur during identity transfer. In this example, the first radiotelephone is a mobile telephone 250 and the second radiotelephone is a car terminal 252. When it is desired to transfer from the mobile telephone to the car terminal, the mobile telephone 250 gathers all the necessary cellular system information (256), such as connection parameters. These parameters are transferred to the car terminal 250 in a step 258. During this time all incoming calls will continue to be routed to the mobile telephone 250. The mobile telephone 250 is then suspended (260) and the car terminal 252 resumes operation, using the gathered cellular system information. Once the car terminal has resumed

operation, all calls are routed to the car terminal 252. A similar operation can be performed when transferring from car terminal to the mobile telephone.

Figure 3 is a block diagram of a system according to a further embodiment of the present invention. Figure 3 shows the same radiotelephones 200 and 208 as shown in Figure 2, although this embodiment allows the transfer of information contained in the SIM of radiotelephone 200 to radiotelephone 208 during a call. If during a call a user wants to transfer from radiotelephone 200 to radiotelephone 208 either the user or the radiotelephone 200 submits a hold request to the network 216. The network 216, in response to the hold request, puts the current call on hold, and transmits a hold request code to the radiotelephone 200. Once the hold request code is received by the radiotelephone 200 information contained in the SIM can be transferred as previously described. Additionally, the hold request code is also transferred to the radiotelephone 208. Once the radiotelephone 208 has acquired information contained in the SIM of the radiotelephone 200, the radiotelephone submits a hold release request to the network. The hold release request includes the hold request code so that the network is able to correctly identify which call is to be released. Once the call has been released by the network the radiotelephone 208 is able to continue the call.

Those skilled in the art will appreciate that the concepts herein described with reference to SIMs, may also be applied to other identification systems. For example, other radiotelephones may use number assignment modules (NAM) or other devices containing embedded identification information. Furthermore, the present invention is not limited for use with radiotelephones and may be used equally with any similar communications devices.

The above description has not entered into detail regarding the specific way in which the data transfer may effect between two radiotelephones. However, those skilled in the art will appreciate that there are many ways in which such

data transfer may be effected including; a low power radio frequency (LPRF) link; a Bluetooth connection; an infra-red connection; a direct wire connection. The mechanisms for deciding when an identity transfer shall take place are also well understood by those skilled in the art, and may be based, for example, on the proximity of two devices, user interaction, detection of direct connection, etc.

CLAIMS

1. A communication system comprising first and second communication devices capable of communicating with a telecommunications network, the first communication device comprising identification information, the second communication device being capable of remotely acquiring at least some of the identification information of the first communication device,
wherein the second communication device is further capable of acquiring connection parameters from the first communication device and applying the acquired parameters to effect a connection to the network.

2. A communications system according to claim 1, wherein the connection parameters provide information relating to the connection of the first communications device to the telecommunications network.

3. A communications system according to claim 1 or 2, wherein the second communications device further comprises a memory for storing the acquired connection parameters.

4. A communications system according to claim 1, 2, or 3, wherein the communication parameters include information relating to any of: the strongest radio channel; available frequency bands; and radio channels in use.

5. The communications system of any previous claim, wherein the identification information is contained in a subscriber identification module (SIM).

6. The communications system of any of claims 1 to 4, wherein the identification information is contained in a number assignment module (NAM).

7. The communications system of any previous claim, wherein the first communications device is adapted for, prior to the second communications device acquiring information from the first communications device, sending a hold request to the network.

8. The communications system of claim 7, wherein the first radiotelephone is adapted for receiving a hold request acknowledgement from the network.

9. The communications system of claim 8, wherein the second radiotelephone is adapted for acquiring the hold request acknowledgement.

10. The communications system of claim 9, wherein the second radiotelephone is adapted to transmit the acquired hold request to the network, thereby effecting a connection to the network.

11. A communications system according to any previous claim wherein the communication devices are radiotelephones.

12. The communications system of any of claims 1 to 11, adapted for use with a system in accordance with the global system for mobile communications (GSM) standard.

13. The communications system of any of claims 1 to 11, adapted for use with a system in accordance with the general radio packet services (GPRS) standard.

14. The communications system of any previous claim, wherein the acquisition of the parameters is effected over a low power radio frequency connection.

15. The communication system of any previous claim, wherein the acquisition of the parameters is effect over a Bluetooth connection.

16. A radiotelephone for use with the communications system of any previous claims.

17. A method of connecting a first communication device to a network using information contained in a second communication device already connected to the network, comprising:

acquiring, at the first communication device at least some of the information contained in the second communication device;

further acquiring, at the first communication device, connection parameters stored in the second communication device;

using the acquired parameters to connect the first communication device to the network.

18. A method according to claim 17, wherein the connection parameters provide information relating to the connection of the second communications device to the telecommunications network.

19. A method according to claim 17 or 18, further comprising storing the acquired connection parameters at the first communication device.

20. A method according to claim 17, 18 or 19, wherein the communication parameters include information relating to any of: the strongest radio channel; available frequency bands; and radio channels in use.

21. A method according to claim 17, 18, 19, or 20 further comprising sending, from the second communication device a hold request to the network.

22. A method according to claim 21, further comprising receiving, at the second communications device, a hold request acknowledgement from the network.

23. A method according to claim 22, further comprising acquiring, at the first communications device, the hold request acknowledgement.

24. A method according to claim 23, further comprising transmitting, from the first communications device, the acquired hold request acknowledgement to the network, thereby effect a connection to the network.

25. A method according to any of claims 17 to 24 for use in accordance with the global system for mobile communications (GSM) standard.

26. A method according to any of claims 17 to 24 for use in accordance with the general radio packet service (GPRS) standard.

27. A communications system substantially as hereinbefore described, with reference to accompanying Figures 2, 2A and 3.

28. A radiotelephone for use with a communication system substantially as hereinbefore described, with reference to accompanying Figures 2, 2A and 3.

29. A method of connecting a first communication device to a network using information contained in a second communication device already connected to the network substantially as hereinbefore described with reference to accompanying Figures 2, 2A and 3.

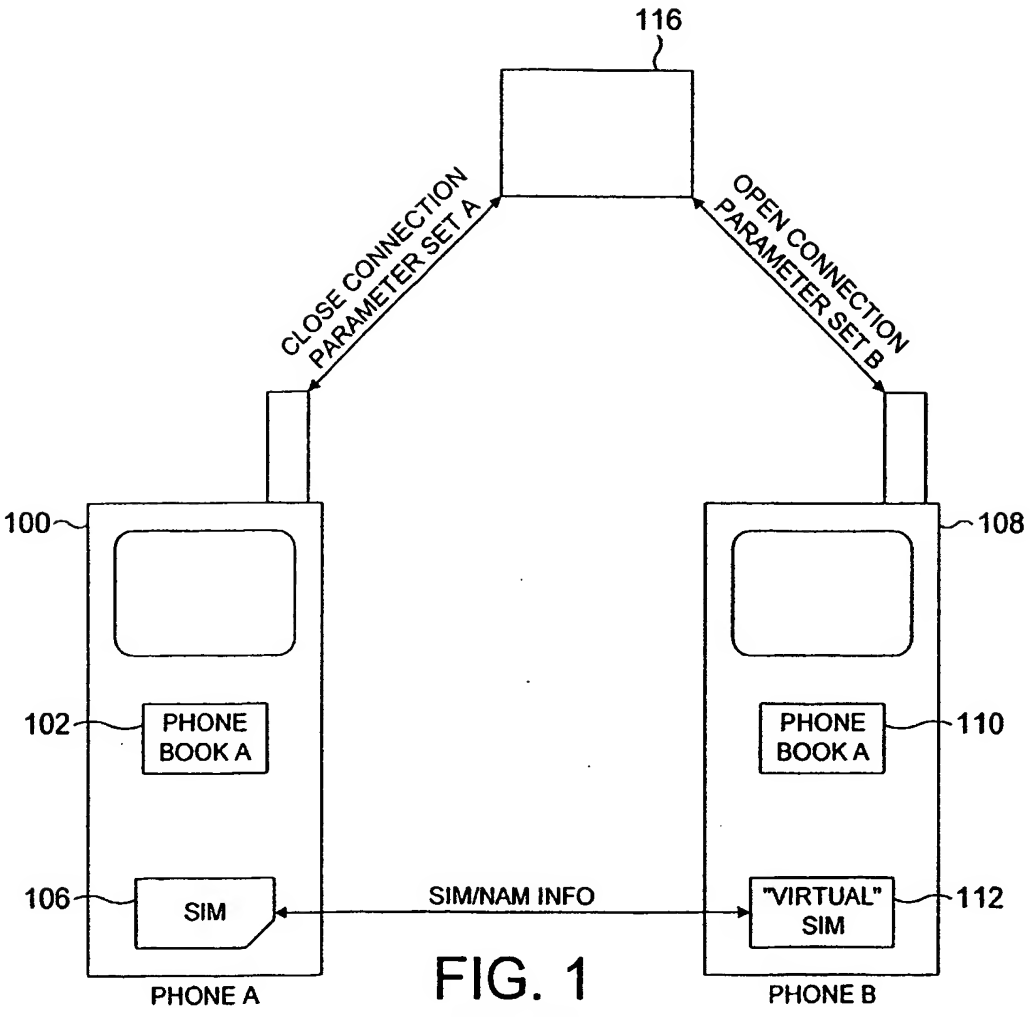

FIG. 1
PRIOR ART

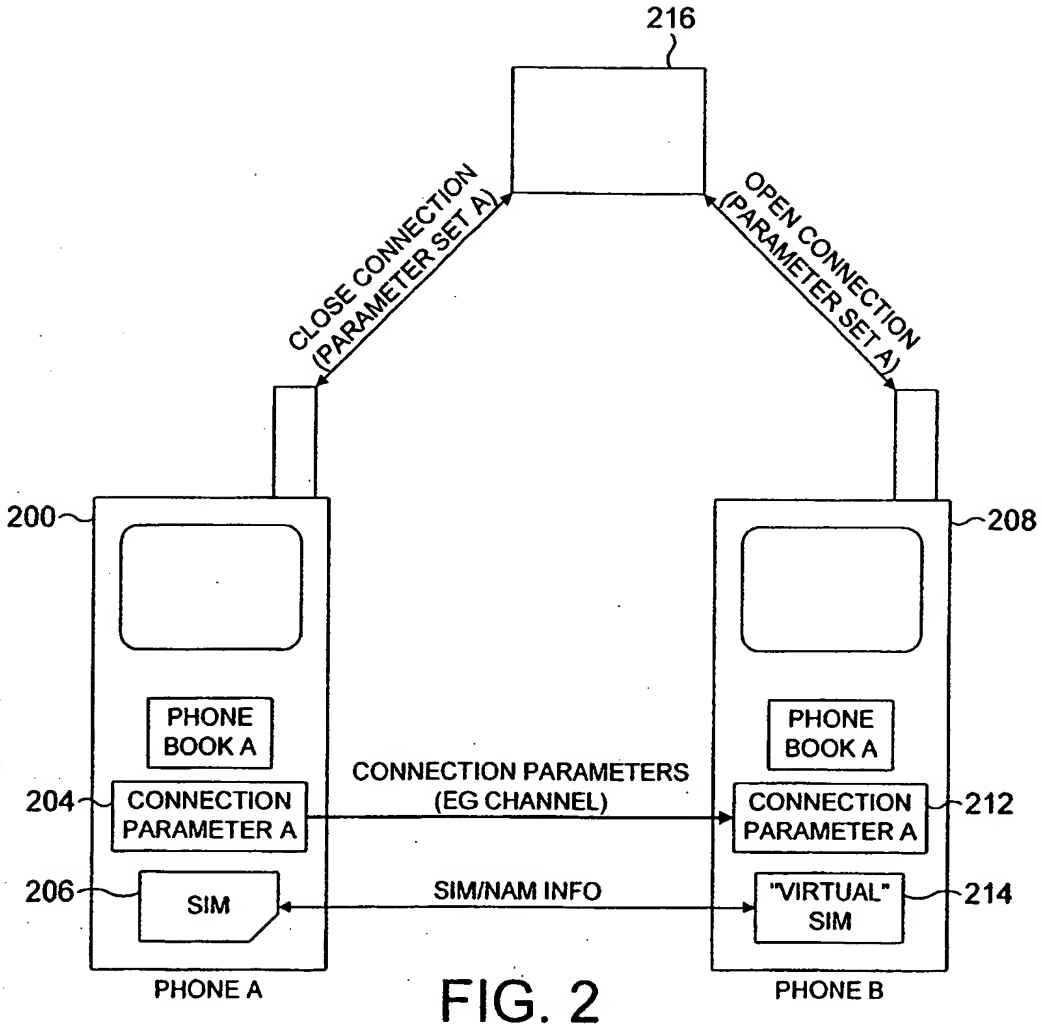

FIG. 2

INVENTION; FIRST EMBODIMENT

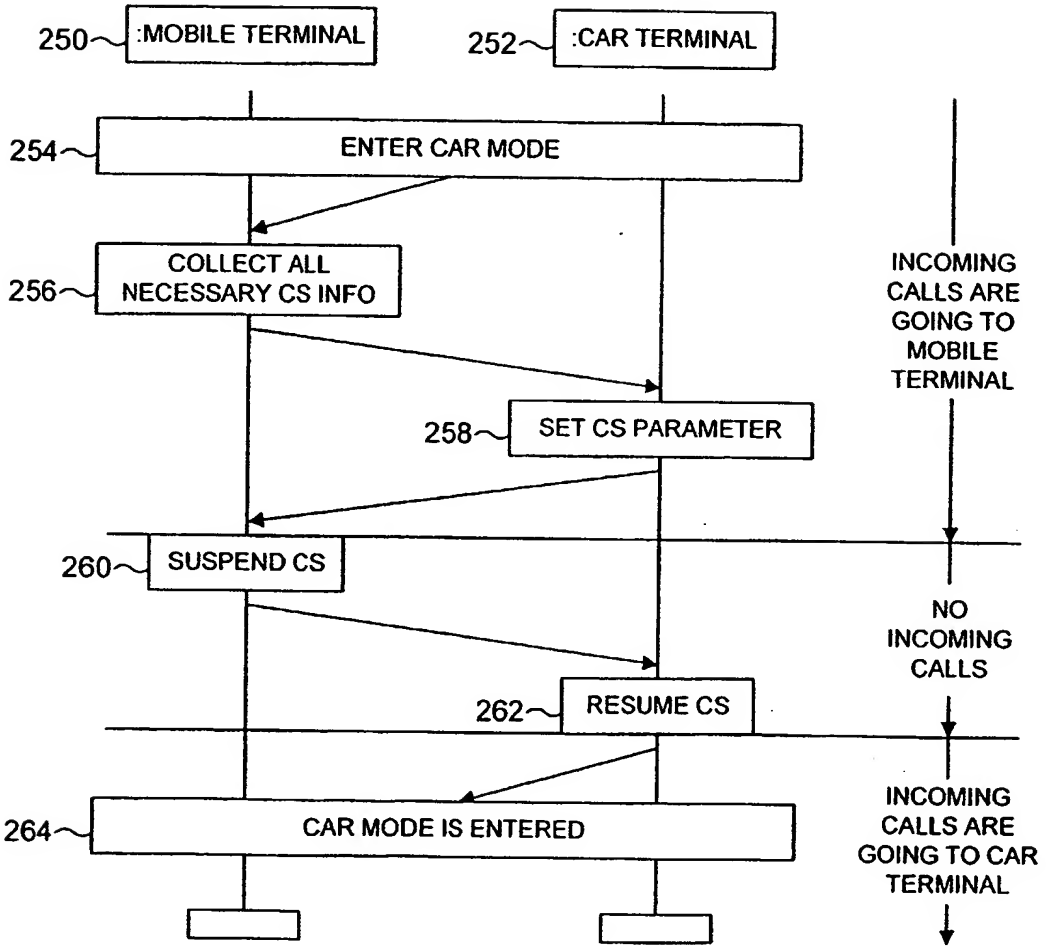
250
:MOBILE TERMINAL
252
:CAR TERMINAL
254
ENTER CAR MODE
256
COLLECT ALL NECESSARY CS INFO
258
SET CS PARAMETER
260
SUSPEND CS
262
RESUME CS
264
CAR MODE IS ENTERED
INCOMING CALLS ARE GOING TO MOBILE TERMINAL
NO INCOMING CALLS
INCOMING CALLS ARE GOING TO CAR TERMINAL

FIG. 2A

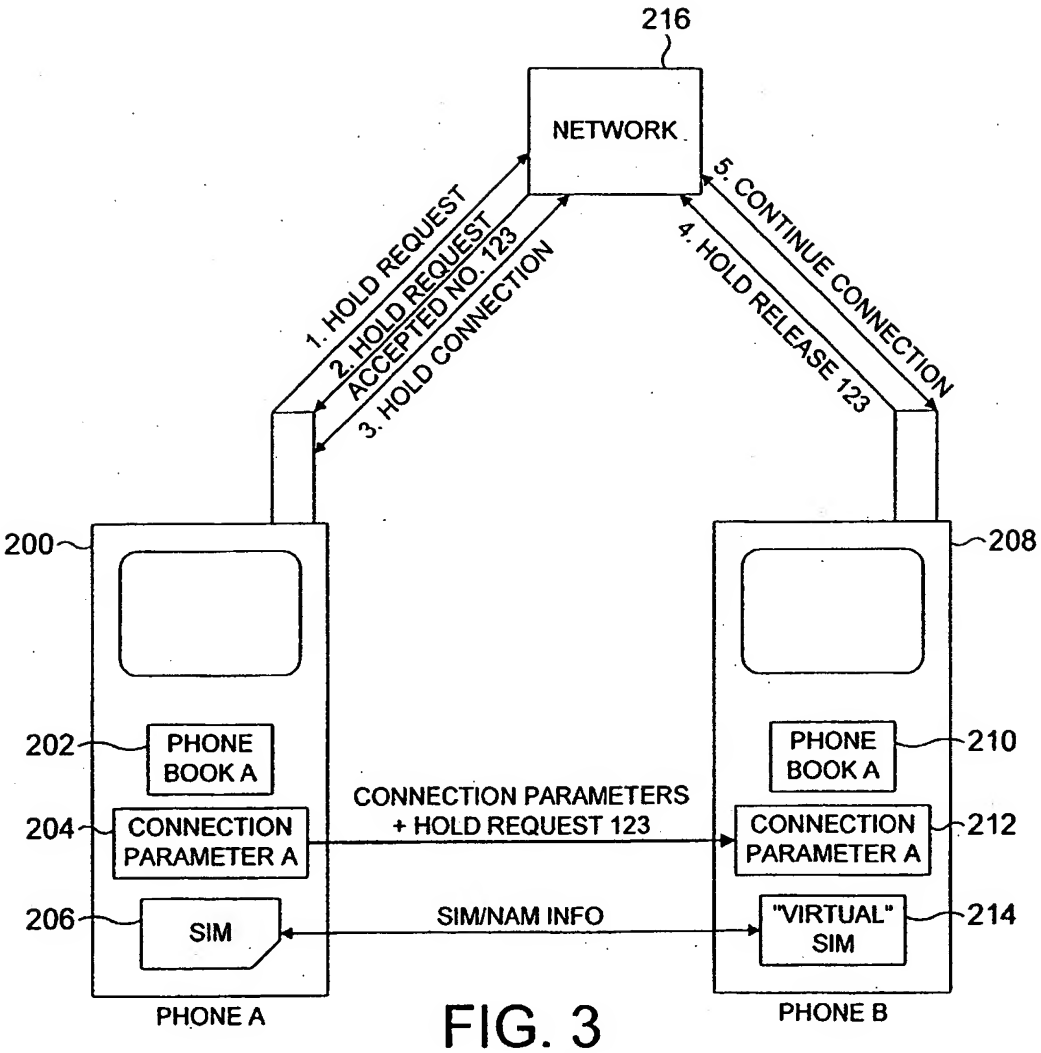

FIG. 3

INVENTION; SECOND EMBODIMENT

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(84) Designated States *(regional)*: ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW),

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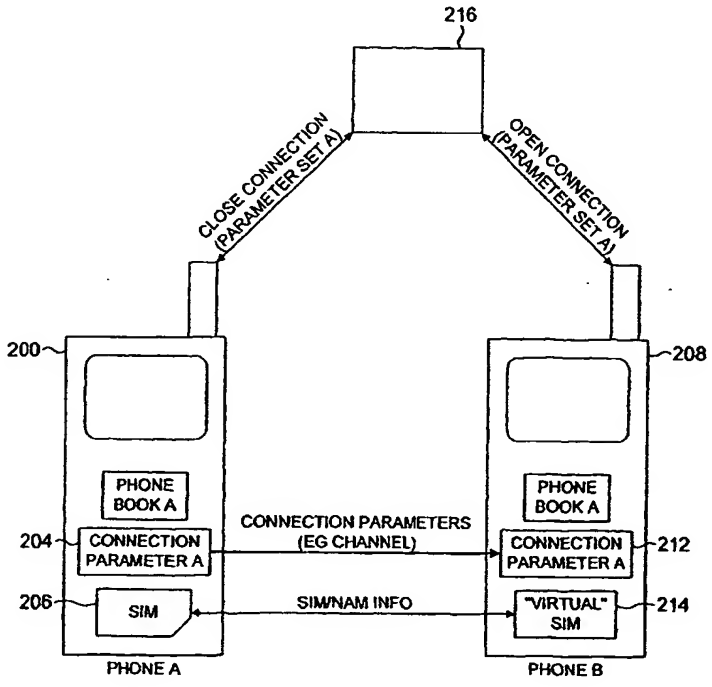
(54) Title: A METHOD FOR TRANSFERING CONNECTION PARAMETERS FROM A FIRST MOBILE STATION TO A SECOND MOBILE STATION



INVENTION; FIRST EMBODIMENT

(57) Abstract: In a typical radiotelephone system, such as GSM, each radiotelephone or cellular device requires a subscriber identification module (SIM) in order to communicate with a telecommunications network. Generally the SIMs are removable from a radiotelephone and may placed in another radiotelephone, which thereby connects to the network using information contained in the SIM. This, however, can prove extremely inconvenient for the user having two or more radiotelephones. One way around this problem is for the user to have just one SIM, and to physically transfer the SIM to whichever radiotelephone is currently in use. This, however, is cumbersome since first the power must be switched off, the SIM must be removed, the SIM inserted into the new device, the new device must be powered on, and finally the new device must go through the initialisation and network authorisation phases. During this time no calls can be made or received. This process is further hindered by the fact that in many radiotelephones the SIM is located behind the battery, so that the additional steps of removing and replacing the battery must be performed. Accordingly, one aim of the present invention is to overcome the above-mentioned problems.

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Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

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INTERNATIONAL SEARCH REPORT

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A. CLASSIFICATION OF SUBJECT MATTER

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According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: H04Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,NO classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

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A	GB 2270442 A (MOTOROLA INC), 9 March 1994 (09.03.94), page 1 - page 3, abstract ---	1-29
A	US 6041229 A (TURNER), 21 March 2000 (21.03.00), column 1 - column 2, abstract ---	1-29
P,X	DE 10012057 A1 (ROBERT BOSCH GMBH), 20 Sept 2001 (20.09.01), column 1 - column 2, abstract --- ---	1-29

☐ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

* Special categories of cited documents:
"A" document defining the general state of the art which is not considered to be of particular relevance
"E" earlier application or patent but published on or after the international filing date
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"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"Y" document of particular relevance: the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
19 August 2002	21-08-2002
Name and mailing address of the ISA/ Swedish Patent Office Box 5055, S-102 42 STOCKHOLM Facsimile No. +46 8 666 02 86	Authorized officer Thomas Tholin /js Telephone No. +46 8 782 25 00

Form PCT/ISA/210 (second sheet) (July 1998)

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